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CORRECTION NOTICES

Vol. 97, No. 9, Sept. 1969: p. 683, paragraph before ACKNOWLEDGMENT, McKinley is to be read instead of Whitney.

Vol. 97, No. 11, Nov. 1969: p. 770, fig. 50 caption, 10^{-2} should precede joules; p. 779, fig. 7A, 1000 joules is to be read instead of 100 joules; p. 788, fig. 27, bottom part, scale of the ordinate is too small by a factor of 10; p. 800, fig. 47, the value of the heat of condensation for the A-model is 0.23 ly/min at 3° latitude; p. 801, footnote 5, add "The poleward transport of various quantities represents the transport across the whole latitude circle in part I (section 5B) and part II, whereas it represents the transport in one model ocean in part III. Therefore, it is necessary to divide the oceanic heat transport in figure 49 of part II by a factor of 3 to compare it with the corresponding transport shown in figure 14 of part III."; p. 802, fig. 51, scale of ordinate, 10^{10} CAL is to be read instead of 10 CAL; p. 810, eq. (17), delete the minus sign; p. 810, eq. (21) and (22), \times should precede each equation; p. 820, eq. (31) is to be preceded by a^2 and eq. (32) by a .

Vol. 98, No. 2, Feb. 1970: p. 100, 3d par., $\mu = \pi 2W$ is to be read instead of $\mu = \pi 2w$; last par., 500 is to be read after 700 in the series of mb; p. 103, 6th par., $\bar{v}\bar{T}$ is to be read instead of $v\bar{T}$; 7th par., ω is to be read instead of 10; p. 104, fig. 6, $\frac{1}{g} \frac{\partial \phi}{\partial p}$ is to be read preceding $\left(10^4 \frac{m^2 mb}{sec} \right)$; fig. 7 caption, negative is to be read instead of positive.

Vol. 98, No. 4, Apr. 1970: p. 271, last par., 3d line, -1 should be read as the superscript instead of 1; p. 274, 1st line below eq. (15), $((r-1)/\Delta t)$ should be read instead of $(r-1/\Delta t)$; p. 278, section 9, 22d line, baroclinic should be read instead of barotropic; p. 315, eq. (1), y is to be read instead of Y ; p. 316, eq. (3), $-\bar{f}u$ instead of $-fu$; eq. (5) 1st line, \bar{v} instead of \bar{v}^2 , and $v\bar{w}$ instead of $v\bar{w}$; eq. (7), left col., 1st line, \bar{v}^* instead of \bar{u}^* ; eq. (7), right col., 1st line, \bar{v}^* instead of \bar{u}^* ; eq. (8), V instead of v in two places; p. 323, par. c, last line, 0.02 should be read instead of 0.20, and 0.001 instead of 0.01; p. 326, 2d par., lines 3 and 10, figure 3 should be read instead of figure 5.

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and R. E. Schlesinger. Transient behavior of Asai's model of moist convection. 375.

YOUNKIN, RUSSELL J.:

and R. F. Browne. Some relationships between 850-mb Lows and heavy snow occurrences over central and eastern U.S. 399.

